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PATENT COOPERATION TREATY

PCT/FR2003/003590



PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

| | | |
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| Applicant's or agent's file reference BIF023238/BQ | FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) | |
| International application No. PCT/FR2003/003590 | International filing date (day/month/year) 04 décembre 2003 (04.12.2003) | Priority date (day/month/year) 09 décembre 2002 (09.12.2002) |
| International Patent Classification (IPC) or national classification and IPC H01L 21/20, 21/18, 21/762, 21/58 | | |
| Applicant COMMISSARIAT A L'ENERGIE ATOMIQUE | | |

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|---|--|
| <p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>6</u> sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of <u>5</u> sheets.</p> | |
| <p>3. This report contains indications relating to the following items:</p> <p>I <input checked="" type="checkbox"/> Basis of the report</p> <p>II <input type="checkbox"/> Priority</p> <p>III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p>IV <input type="checkbox"/> Lack of unity of invention</p> <p>V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p>VI <input type="checkbox"/> Certain documents cited</p> <p>VII <input type="checkbox"/> Certain defects in the international application</p> <p>VIII <input type="checkbox"/> Certain observations on the international application</p> | |

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|--|--|
| Date of submission of the demand 09 juin 2004 (09.06.2004) | Date of completion of this report 15 March 2005 (15.03.2005) |
| Name and mailing address of the IPEA/EP | Authorized officer |
| Facsimile No. | Telephone No. |

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/FR2003/003590

I. Basis of the report

1. With regard to the elements of the international application:*

- ☒ the international application as originally filed
- ☒ the description:
pages 1-23, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____
- ☒ the claims:
pages _____, as originally filed
pages _____, as amended (together with any statement under Article 19
pages _____, filed with the demand
pages 1-35, filed with the letter of 11 February 2005 (11.02.2005)
- ☒ the drawings:
pages 1/6-6/6, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____
- ☐ the sequence listing part of the description:
pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/FR 03/03590

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | | |
|-------------------------------|--------|------|-----|
| Novelty (N) | Claims | 1-35 | YES |
| | Claims | | NO |
| Inventive step (IS) | Claims | 1-35 | YES |
| | Claims | | NO |
| Industrial applicability (IA) | Claims | 1-35 | YES |
| | Claims | | NO |

2. Citations and explanations

1. Reference is made to the following documents:

D1: FR-A-2 789 518 (COMMISSARIAT ENERGIE ATOMIQUE)
11 August 2000;

D2: FEIJOO D ET AL: "Prestressing of bonded wafers"
PROC. FIRST INT. SYMP. ON SEMICONDUCTOR WAFER
BONDING: SCIENCE, TECHNOLOGY AND APPLICATIONS,
PHOENIX, AZ, USA, 13-18 OCT. 1991, pages
230-238.

2. The subject matter of claim 1 is novel (PCT Article 33(2)) and involves an inventive step (PCT Article 33(3)).

2.1 Document D2, which is considered to be the prior art closest to the subject matter of claim 1, describes steps of (the references between parentheses apply to said document):

- assembling the two basic structures (D2, page 230, the abstract);
- creating a difference in tangential stress state

between the two surfaces to be assembled, which difference is generated by curving both of said two basic structures to be assembled by exerting mechanical force on each of said two structures (D2, page 230, the abstract; page 233, paragraph 3; figure 1); and

- producing, within the assembled structure, a predetermined stress state under specific conditions relative to the assembly conditions (D2, page 233, paragraph 3).

2.2 It follows that the subject matter of claim 1 **differs** from this known method in that:

- the two structures are curved **before** said two basic structures are brought into contact.

2.3 **The subject matter of claim 1 is, therefore, novel (PCT Article 33(2)).**

2.4 The **problem** that the present invention is intended to solve can therefore be considered to be that of enhancing the quality of the assembled structure.

2.5 **The solution to this problem, as proposed in claim 1 of the present application, is considered to involve an inventive step (PCT Article 33(3)), for the following reasons:**

Document D2 does not disclose that the structures are curved before they are brought into contact. On the contrary, it appears that, in D2, the two structures are firstly brought into contact and then curved by exerting mechanical force thereon (D2,

page 230, paragraph entitled "Experimental Procedure"; figure 1).

Even though document D1 describes two structures that are curved **before** being brought into contact (D1, page 21, lines 9-15; page 20, lines 9-16), D1 does not describe the exertion of mechanical force on said two basic structures in order to curve same. In D1, the two structures are curved by applying curve-inducing stress-adaptation layers thereto.

It is not considered to be obvious for a person skilled in the art to use, with a corresponding effect, the features in document D2, which describes the exertion of **mechanical force after** the two structures have been brought into contact, in combination with the features in document D1, which describes the application of **stress-adaptation layers before** said two structures are brought into contact.

- 2.6 It follows that the subject matter of claim 1 involves an inventive step (PCT Article 33(3)).
3. Claims 2-35 are dependent on claim 1 and, as such, therefore also fulfil the PCT requirements of novelty and inventive step.
4. The subject matter of claims 1-35 fulfils the requirements set forth in PCT Article 33(4).